THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

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Expect 50,000 Metal Men at Western Show

Expectations are that 50,000 manufacturing plant operators, superintendents, production men, engineers, purchasing agents, metallurgists and metal workers will attend the Fourth Western Metal Congress and Exposition May 19 to 23 in Los Angeles.

A. G. Zima

Sponsored by the American Society for Metals, the Congress will consist of technical sessions held at the Biltmore Hotel and the Pan-Pacific Auditorium, and 60,000 sq. ft. of exhibit space at the Auditorium, where W. H. Eisenman, secretary of the Society, has established headquarters until the end of the meeting.

A. G. Zima, general chairman, said the theme of the Congress and Exposition will be "new aids to production", a demonstration of progress to increase economy and speed in the part the metal industry will play in the defense program.

D. S. Clark

The technical program for the Congress is in charge of D. S. Clark, associate professor of mechanical engineering, California Institute of Technology, Pasadena, who is securing outstanding metallurgical authorities from all parts of the country to present a series of lectures on technical subjects.

More than 75% of the exhibit space has been allotted, according to Mr. Eisenman, and a keen demand for the balance is seen.

Western sections of 19 national technical societies will cooperate in the

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Information Please Experts Answer Varied Questions

Reported by F. N. Meyer
Technical Supervisor, Waterbury Branch American Brass Co.

New Haven Chapter, on Jan. 16, conducted an "Information Please" meeting at the auditorium of the Connecticut Light & Power Co. in Waterbury.

Samuel Spalding acted as technical chairman and the board of experts consisted of Messrs. Freeman, Richter, Van Tassel, Keshian and Sawtelle. These men covered the fields of brass, cast iron, steel and applications, and malleable iron.

Representative topics were available so that each of the experts had anywhere from four to six questions on his particular subject to cover.

In addition to the written questions which had been sent in, an opportunity was given from time to time for pertinent questions to be asked from the floor, which tended to increase the interest in the proceedings.

Certificate Awarded to Sauveur Lecturer

Chairman R. F. Harrington Presents M. A. Grossmann, of Carnegie-Illinois Steel Corp., With a Framed Certificate Commemorating the Second Sauveur Memorial Lecture of the Boston Chapter Held on Jan. 3.

Grossmann Discusses Heat Treating Principles at Boston's Sauveur Night

Reported by R. G. Sault
Vice-President, Porter Forge & Furnace Inc.

Boston Chapter again paid homage to its late honorary member, Dr. Albert Sauveur, on its annual Sauveur night held Jan. 3. Reminiscences of Dr. Sauveur by the coffee speaker, National Secretary W. H. Eisenman, formed a rare treat.

The evening was made complete when E. L. Reed, a former student and faculty associate of Dr. Sauveur, introduced M. A. Grossmann, director of research of the Carnegie-Illinois Steel Corp., also a former student under Dr. Sauveur.

Dr. Grossmann was then presented with the framed certificate which awarded him the distinction of being the second Sauveur memorial lecturer, by Chairman R. F. Harrington.

After the brief ceremony Dr. Grossmann presented his subject, "Principles of Heat Treatment", and held his audience, numbering approximately 350 members and guests, easily interested. A lively question and answer period followed Dr. Grossmann's lecture.

The announcement of the 1941 educational course on "Metallurgical Inspection", as outlined in the December issue of THE REVIEW, was made by its chairman, J. V. Baxter.

Technical Papers Invited

All members of the Society are cordially invited to submit technical papers to the Publication Committee for its consideration for presentation before the National Metal Congress and Exposition to be held in Philadelphia Oct. 20 to 24, 1941.

Papers should be sent to the National Office in Cleveland to the attention of Ray T. Bayless, assistant secretary, American Society for Metals, not later than June 20, 1941. Prior notification of your intention to submit a paper is desirable.

Plant Inspections Included In North West Course

A practical educational course of seven meetings consisting of discussions, demonstrations and inspections is being sponsored by the North West Chapter of the Society.

Classes are held in Coffman Memorial Union, University of Minnesota, except when plant visitations are scheduled. S. Reed Hedges of Minneapolis-Moline Power Implement Co. is chairman of the Educational Committee.

Subjects and speakers are as follows:

Jan. 23—Ordnance Requirements; Lt. Col. F. I. Gilbert, Ordnance Office, 6th Division.

Feb. 6—Navy Specifications and Inspection; Lt. Commander B. K. Culver, Chief District Navy Inspector.

Feb. 20—Arc Welding; Amos Johnson, Chief Welding Instructor, Commercial Gas Co. (Plant Visitation, American Hoist & Derrick Co.)

Mar. 6—High Strength Irons; J. L. Gibney, Research Engineer, Auto Specialties Co.

Mar. 20—Magnesium Alloys; Al Turnquist, Sales Engineer, Dow Chemical Co. (Discussion at Minneapolis-Moline Power Implement Co.; Plant Visitation, Modern Pattern Co.)

Apr. 3—Flowability of Metals; Speaker to be announced.

Apr. 17—Plant Visitation.

Physics of Metal Cutting Incites Much Discussion

Reported by R. W. Weld
Service Engineer, Claud S. Gordon Co.

Indianapolis Chapter — Dr. Mario Martellotti, Cincinnati Milling Machine Co., met a large turn-out on Jan. 20, for a lecture on "Physics of Metal Cutting". His talk is reported on page 5.

The lengthy discussion that followed gave evidence that the members of the Indianapolis Chapter are greatly interested in the subject of metal cutting.

Leaded steels were frequently mentioned during this period and tool dressing came up for a good share of the comment.

A. E. Focke, Diamond Chain and Mfg. Co., has charge of the educational program this year, which started Jan. 27. The course is on alloying elements in steel, and the class is expected to be the largest since the Indianapolis Chapter commenced educational work.

Stainless Steel Is Colored by New Process

Rochester Chapter — The "Coloron Process" for chemically coloring stainless steel was the subject of the talk given by Clements Batcheller, development engineer, Allegheny Ludlum Steel Corp, Watervliet, N. Y., on Dec. 9.

Stainless steels are finding a rapidly increasing utility in many arts where the application of permanent oxide colors may be used either to create aesthetic contrast and reduce surface monotony, or to modify or even completely change the surface characteristics.

By using photo-lithographic printing methods on pre-colored stainless any design or image of high fidelity can be produced. In the application of design to a pre-colored metal, a color "stripping" step is necessary whereby any unwanted color can be removed as a means of creating contrast and fine detail.

The ability to control the degree of porosity of the applied oxide film without reduction of its integral adherence to the base metal has opened up important new uses in the field of general lithographic printing, and produces much better "printing masters" of stainless than can be produced from either zinc or aluminum.

The "printing master" used in photo-lithography is a specially prepared plate upon which is recorded a developed photo image. Zinc or aluminum plates have basic defects which may be

(Continued on page 8)

Situation in Strategic Metals Is Improved

Reported by J. M. Gotshall
General Foreman, Timken Roller Bearing Co.

Canton-Massillon Chapter — E. E. Thum, whom we all know best as the editor of METAL PROGRESS, addressed the group on Jan. 16, on "Strategic Metals".

His talk, printed in full in the February issue of METAL PROGRESS, was very enlightening in that he pointed out some of the steps already taken to eliminate the possibility of shortage of these materials so necessary to our welfare in case of emergency.

He brought out the fact that, due to the farsightedness of those concerned, the situation is in much better shape than it was 18 months ago regarding both strategic and critical materials.

This has been brought about not only by creating huge stockpiles, but by making searches to attempt to find ores within our own borders or a source of supply less apt to be cut off in case of war. Substitution also will enter the picture.

The talk was very interesting and given in sufficient detail to be highly instructive and was very well received. Questions from the floor followed and concluded the official evening's activity.

A coffee talk by John Quinn, chairman of Canton Territory Defense Committee, on "Local Defense Activity" immediately followed the dinner. Mr. Quinn is plant manager of the United Engineering & Foundry Co.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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Steel Casting Discussion Centers on Deoxidation

Reported by James W. Poynter
Asst. Met. Army Air Corps, Wright Field

Dayton Chapter—Under the subject "Ferrous Castings", H. A. Schwartz, manager of research of the National Malleable and Steel Castings Co., Cleveland, speaking at the January meeting, discussed melting practice, microscopic structure, equilibrium diagrams, and effect of alloying elements as applied to cast steels and the various types of cast irons.

One point brought out was that the same Brinell hardness-tensile strength conversion chart cannot be used for all graphitic materials and for steels.

In response to questions, Dr. Schwartz discussed the conditions determining the carbon content of the metal in the cupola and the desirable deoxidation practice for steel castings.

Complete deoxidation is desired but the presence of sonims in grain boundaries is harmful. Three different methods are employed using titanium, calcium silicide or large amounts of aluminum.

F. C. Sommers, the coffee speaker from the Bureau of Internal Revenue, briefly outlined the changes which have been made in the income tax regulations this year and then answered as many questions as time permitted.

A.S.M.E., A.F.A. Meet With Cincinnati Chapter

Reported by K. Siems
Sales Engineer, Cincinnati Milling Machine Co.

Cincinnati Chapter opened the New Year with an auspicious meeting when 135 members and friends of the Chapter, the Cincinnati Section of the A.S.M.E., and the Cincinnati Group of the A.F.A. attended a joint meeting sponsored by the A.S.M. on Jan. 9.

A 40-min. color and sound film entitled "The Power Behind the Nation", depicting the mining, transportation, uses of, and products derived from coal was shown through the courtesy of the Coal Bureau and the advertising department of the N. & W. Railway Co. It was adjudged one of the finest industrial pictures the Chapter has seen.

Equally outstanding was the technical part of the meeting which was a lecture delivered by Carl W. Briggs, technical adviser of Steel Founders' Society of America, Cleveland, who spoke on "Design of Steel Castings". His talk has been reported in a previous issue of THE REVIEW.

Structure of Engine Irons Important in Wear Performance

Reported by Richard C. Fox
Metallographist, Continental Motors Corp.

Grand Rapids Group, Detroit Chapter—"The Structure and Wear of Engine Cast Irons" was the title of a talk presented by Paul S. Lane, research engineer, Muskegon Piston Ring Co., Muskegon, Mich., at the regular meeting on Jan. 20.

This paper was mainly a discussion of the speaker's experiences with laboratory wear tests of gray irons and their correlation with actual service.

In a general discussion of wear theory, it was pointed out that wear resistance is largely determined by service environment. Also, we are usually interested in the mutual wear of two rubbing surfaces.

Some brief comments were made regarding the effect of lubrication, both during break-in and under normal running, and the effect of hardness on wear was discussed.

The machine used to make laboratory wear measurements was described, and results were correlated with cylinder castings from steam, diesel, and automotive engines.

Throughout this discussion, the structural characteristics of the irons were shown to play an important part in determining wear performance. Some iron structures have low rates of wear but are more prone to scuffing and scoring, while other structures have higher weight loss, but possess the ability to wear clean.

The nature of the iron structure found in present-day piston rings was compared with that found in automotive cylinders.

Annealed irons tend to give high wear values unless they are operated under abundant lubrication. An example was given of reducing wear by the use of combination materials.

In conclusion, it was stated that our wear practice is far ahead of wear theory. It is true that in many cases it has been found necessary to use gray iron having what might be termed "compromise structures", but by means of laboratory wear testing apparatus, the wear performance of such structures can be determined with a reasonable degree of safety.

High Power Mike Gets Officers' Approval

Secretary Eisenman and President Harder Inspect University of Notre Dame's Metallographic Equipment Under A. R. Troiano's Guidance.

Appropriate Guests Herald New Year at Notre Dame

Reported by Francis T. McGuire
Teaching Fellow, University of Notre Dame

Notre Dame Chapter—The month of January brought the New Year and National President Oscar E. Harder. The refreshing youthfulness of 1941 was typified by Dr. Harder's interesting lecture on bearing metals, while the gaiety and frivolity of the eve of the New Year had our genial secretary, Bill Eisenman, as the cherub.

A splendid turnout greeted the officers at dinner in the University Dining Hall prior to the meeting.

The physical metallurgy of bearing metals was adequately described by Dr. Harder, as well as the use of powder metallurgy methods and some of the new bearing metal developments.

Croft Discusses Principles of Alloying Copper; First Consideration Is Strength

Reported by George S. DeArment
Asst. Plant Mgr., Champion DeArment Tool Co.

Northwestern Pennsylvania Chapter—Guests at the meeting held at the Talon Club in Meadville, Pa., on Dec. 12, were the speaker, Harry P. Croft; the technical chairman, Earl Lawson; E. Knudsen, R. T. Geissinger, all of Chase Brass and Copper Co. of Cleveland; and Karl Knapp of Universal-Cyclops Steel Corp.

Mr. Croft, chief metallurgist, Cleveland Plant, Chase Brass and Copper Co., concerned himself with the basic principles of alloying copper.

The first consideration in copper alloys is strength. Each per cent of added element has its own rate of strengthening. Furthermore, one element may have a more marked effect on strength in the hardened state than in the annealed state.

When two or more alloying elements are added to copper the combined effect can be roughly anticipated by the sum of the strengthening effects of the individual elements. This applies only to the alpha phases of the copper alloys.

There is a straight line relation between elongation and tensile strength; alloying elements tend to increase tensile strength.

The next consideration in copper alloys is electrical and thermal conductivity. Added elements reduce both the electrical and thermal conductivity, even those that have a higher conductivity than copper itself.

Another point of importance in copper alloys is machinability. Additions of tellurium, lead, and selenium increase machinability.

In discussing corrosion resistance, the speaker stated that dezincification can apparently be prevented by addition of small amounts of antimony, phosphorus or arsenic. These elements probably form a self-healing, continuous film, possibly of their oxides, and thus inhibit corrosion.

Mr. Croft concluded his lecture by speaking briefly of two new aluminum bronzes particularly adaptable for corrosion resisting applications.

Metal Powders Discussed

Muncie Chapter—Joseph E. Drapeau, Jr., technical director, Metals Refining Co., Hammond, Ind., spoke on Jan. 13 on "Metal Powders".

His talk covered the history of metal powders, general methods of manufacture, the general trend in specifications of metal powders, the use of metal powders in fabricating, as well as the various fields in which they have found application.

He also touched on some of the future trends in powdered metals.

Role of Welding in the Defense Program Covered

Reported by R. E. Neils
Design Engineer, U. S. Forest Service

Oregon Chapter—At a special meeting on Jan. 23, J. F. Lincoln, president of the Lincoln Electric Co., Cleveland, gave a very interesting illustrated talk on the use of welding in the national defense program, which covered appropriate design for application of the welding art.

A Christmas party was held on Dec. 13 at the Congress Hotel with 106 members and guests present. The evening started at 6:30 p.m. with liquid appetizers, followed by dinner and a floor show.

Past-chairman Peck put on a question and answer contest that was second to none heard on the air. Chairman Healy then presented Mr. Peck with a woolen blanket in appreciation of his efforts as chairman last year.

d'Arcambal "Packs 'Em in and Pours It on" in Houston

Reported by L. D. Richards
Heat Treat Dept., Hughes Tool Co.

Texas Chapter—By reason of the fact that A. H. d'Arcambal was speaker of the evening and that he is president of the American Society of Tool Engineers, a joint meeting with the Houston Chapter A.S.T.E. was staged on Jan. 9.

The gathering set a new high for attendance and enthusiasm for A.S.M. in the oil city.

Texas has long held Mr. d'Arcambal in high esteem. When he speaks here he packs 'em in and having packed 'em in he leans 'em forward onto the edges of their chairs and pours it on.

Then along about 11:30 when the questions are coming thick and fast and he has really warmed up to his subject, he nonchalantly remarks, "Well fellows, my train doesn't leave until eight in the morning. Looks like we've got something started here! Let's keep it going."

Mr. d'Arcambal spoke of machinability of metals, digressing occasionally to such topics as heat treatment of gage blocks and the thermal reactions of a well known type of femininity.

He took occasion to bear down with emphasis on press propaganda which belittles the results being achieved toward national preparedness. In fact he cited numerous statistics in support of his contention that the program is a husky, thriving youngster.

The coffee talk of the evening was delivered by M. H. Jacobs, associate editor of the Houston *Post*, whose regular radio feature, "Current Opinion", is a favorite foreign news medium in the Gulf Coast region.

Series of Lectures Is Based on A.S.M. Metals Handbook

Reported by C. A. Barnett
Engineer, Caterpillar Tractor Co.

Peoria Chapter—President's night on Jan. 10 with President Harder and Secretary Bill Eisenman provided a very instructive and enjoyable evening ushering in the second half of the season's program. A large crowd of 114 members and guests showed the national officers that the Chapter is on its toes.

With the completion of the fall educational program on the principles of metallography by Prof. H. L. Walker, the Educational Committee has arranged an interesting spring educational program, to be headlined "Metals". Prof. A. L. Siepert of the Bradley Polytechnic Institute of Peoria is chairman of this committee, with G. C Riegel, E. Nordstrom and Phil Becker, Jr., assisting.

This series of lectures is in fact a general review of the A.S.M. Handbook tending to familiarize the members with its usage. The lectures are held at Bradley College as follows:

Jan 20—Commonly Used Metals, Origins and Methods of Manufacture; G. C. Riegel, Caterpillar Tractor Co.
Jan. 27—Chemical and Physical Properties of Ferrous and Non-Ferrous Metals; C. A. Davis, Jr., Caterpillar Tractor Co.
Feb. 3—Methods of Testing; J. E. Nordstrom, Keystone Steel & Wire Co.
Feb. 17—Processing and Fabrication of Metals; E. E. Isgren, R. G. LeTourneau, Inc.
Feb. 24—Heat Treatment; Prof. H. L. Walker, University of Illinois.
Mar. 3—Application and Failures in use of the Various Metals, and their Relative Values; J. W. Bridwell, Caterpillar Tractor Co.

Dull Moments Like Hen's Teeth at Officers Night

Milwaukee Chapter, on National Officers Night, entertained, or rather, was entertained by National President Oscar E. Harder, assistant director at Battelle Memorial Institute, and William H. "Bill" Eisenman, our well-known and well-liked national secretary.

Needless to say, dull moments were as scarce as a proverbial hen's teeth. Bill Eisenman started things going with his yearly report of the accomplishments of the Society. Like a chef who knows his stuff when it comes to dishing it out, he didn't fail with the necessary spice and trimmings.

Dr. Harder chose "Intermetallic Compounds and their Importance to Industry" as his topic for the main address. Apparently undaunted by Bill Eisenman's stories, Dr. Harder concluded with a few of his own about fish. With a true scientific spirit he even showed slides to prove them.

Fellowships Established At Columbia University

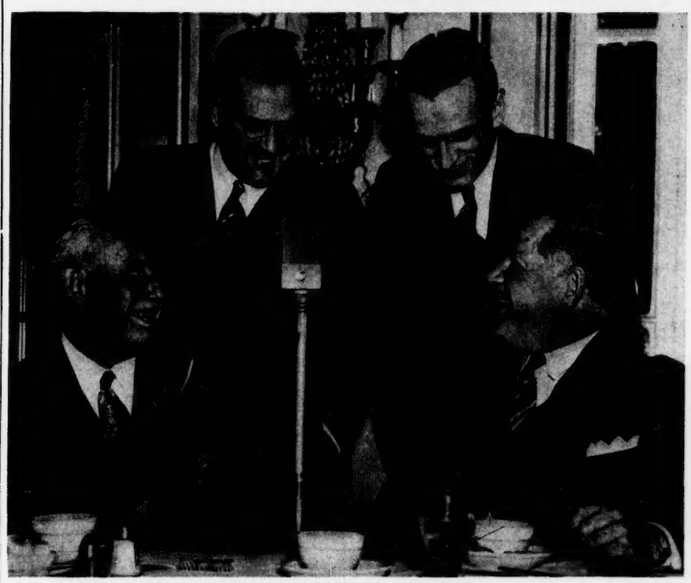
Through the bequest of the late William Campbell, for many years Howe professor of metallurgy at Columbia University, two fellowships have been established. They are awarded primarily for graduate study and research in the field of metallurgy.

Applications accompanied by certified transcripts of academic records, statements of proposed research projects and proposed fields of graduate studies should be filed with the secretary of the University before March 1, 1941. Application blanks and announcements will be forwarded to interested persons by the secretary of the University on request.

It is also expected that one or two assistantships in the department of metallurgy will be available for the academic year 1941-2. For further information write to Prof. Eric R. Jette, School of Mines, Columbia University, New York City.

Peoria President's Night Is Big Event

An Illuminated Sign on the Marquee of the Pere Marquette Hotel Advertised This A.S.M. Meeting in Peoria



President Harder Spoke on Recent Developments in Metallurgy on Jan. 10. Behind him and Secretary Eisenman stand G. C. Riegel (left), technical chairman for the evening, and C. A. Davis, Jr., Chapter chairman.

Historical Study of Condenser Tubes Traces Dezincification

Reported by R. C. Dalzell
Technical Advisor, Revere Copper & Brass, Inc.

Baltimore Chapter, competing with inauguration day functions, drew about 100 men to hear E. S. Bunn, assistant director of research, Revere Copper & Brass, Inc., Rome, N. Y.

Mr. Bunn reported on a most interesting historical study that he has made of the development of condenser tube and condenser tube alloys. Condenser alloy development was taken as illustrative of the problems encountered in the production of general non-ferrous alloys.

The introduction of electrolytic copper in brass manufacture stopped the accidental introduction of arsenic into the mixtures and gave rise to dezincification, a hitherto unknown type of corrosion.

It wasn't until 1909 that Sir Gerald Muntz decided that some element formerly found in fire-refined copper was absent from electrolytic copper and that this element must be necessary to prevent dezincification. And it took until 1922 for the British scientists to determine that arsenic in trace amounts was the essential ingredient to prevent this type of corrosion.

Mr. Bunn reports that so far as he has been able to determine, no one has ever reported dezincification occurring in arsenical admiralty tubes.

The talk brought out the importance of close cooperation between producers and consumers in the study of corrosion and development of alloys to meet particular conditions.

Specimens Illustrate Many Applications of Powders

Reported by Warren H. Williams
Student, Penn State College

Penn State Group—D. O. Noel, Metals Disintegrating Co., Elizabeth, N. J., addressed the students on Jan. 8. Mr. Noel spoke on "Powder Metallurgy", one of the important phases of metallurgy today.

After a short history of the topic, he spoke of the present applications in industry: Lamp filaments, resistance wires, chemical parts, graphitized and porous self-lubricating bearings, filter plates, and electrical contacts. He exhibited specimens to the group throughout his talk.

The business meeting was concerned with increasing our membership to above the century mark.

Aluminum Bronze Now Made as Coated Weld Rod

Aluminum bronze in the form of a coated weld rod is now being produced by Ampco Metal, Inc. of Milwaukee. The useful properties of aluminum bronze—namely, wear resistance, high strength, hardness, and resistance to fatigue and corrosion—are thus extended to a new product.

Actual tests of the new material show excellent Rockwell hardness and ultimate strength figures as compared to older bronze welding materials.

"Ampco-Weld", as it is known, is available in various grades, and is being used for rebuilding worn cams, gears, dies and bearing surfaces, as well as in original work where the bearing properties and corrosion resistance of the metal, combined with strength and hardness, can be used to advantage.

Type of "Cell" Affects Copper Corrosion Rate

Reported by F. N. Meyer
Technical Supervisor, Waterbury Branch
American Brass Co.

New Haven Chapter—Alan Morris, chief metallurgist, Bridgeport Brass Co., gave an interesting talk on "Corrosion of Copper and Copper Alloys" at the December meeting in Bridgeport.

The mechanism of corrosion has come to be generally considered an electrochemical process. Dr. Morris used the electromotive series of metals to point out the differences between the corrosion of active metals and of copper.

Copper and copper alloys are "nobler" than hydrogen in the electromotive series, so are not corroded by non-oxidizing acids unless oxygen or some oxidizing compound is present.

Corrosion rates are affected by several types of "cells." The most familiar cell is the combining of two metals to form a galvanic couple. This leads to the accelerated corrosion of the more active metal, but many observations have indicated that the danger from this type of corrosion is often over-emphasized.

A cell set up by difference in oxygen content in two parts of a solution will cause corrosion of the metal in contact with the solution low in oxygen while metal in the more aerated part of the solution will be protected.

Films Also Affect Rate

Corrosion of copper is especially affected by cells set up by differential metal ion concentration and differential velocity of solution. The metal in contact with solution low in metal ions will be corroded more than the metal in contact with another part of the solution high in metal ions.

Films formed from corrosion products have an important effect on corrosion rate. Insoluble corrosion products when formed in contact with the metal as non-porous films will hinder or stop corrosion.

Increasing the temperature of corroding solutions increases the activity of solution and often dissolves protective films and increases corrosion rate.

Dr. Morris described several common types of corrosion and their relation to the factors outlined above.

Types of Copper Corrosion

1. The general wasting away of a metal by acid solutions containing air or an oxidizing salt, such as occurs in mine water.

2. Deposit attack in which a particle of scale, cinder or other debris settles on a metal and sets up a differential aeration cell.

3. Dezincification wherein a brass dissolves as an alloy and copper replates. In acid solution, dezincification is usually uniform over a part, but in nearly neutral or alkaline solution, so-called "plug-type" dezincification occurs.

4. Corrosion-erosion or impingement corrosion is a problem in condenser tubes where turbulent flow and air bubbles prevent formation of protective films. Differential velocity cell action may be a contributing factor.

5. Water-line corrosion is an example of differential metal ion concentration corrosion and differential aeration cell action. Solution high in metal ions flows down the metal wall and draws in solution low in metal ions at the water line where corrosion occurs. At the same time oxygen diffusion is relatively rapid in the meniscus region as compared with the area below the water line.

Los Angeles Chairman Greets Speaker

M. Asimow (Left) Was the Principal Speaker at the January Meeting of the Los Angeles Chapter. He is shown with A. G. Zima, Chapter chairman.

Asimow Shows How Hardenability Curves Are Applied to Odd Shapes

Reported by R. Lowry
Metallurgist, Hydril Co.

Los Angeles Chapter—M. Asimow, Central Metal Products Co, spoke on "Hardening of Odd Shapes" before 85 members and guests on Jan. 16.

Mr. Asimow presented many curves, probably the most valuable of which was the curve for estimating the severity of quench in plates. Those who have made use of the data by the same author in working with rounds will greatly appreciate this curve. The approximate determination of hardenability, severity of quench and ideal critical size was shown to be possible with these curves, when the specific reaction of a given size to the quench used is known. Curves also showed relations of ideal critical sizes of round bars and plates.

An alternative system based on comparison of equivalent diameters of rounds, plates and rectangular blocks showed good correlation of values obtained. Again, equivalent diameters may be derived directly from the hardness readings at given points on the cross-sections of test pieces.

The speaker also brought out methods of determination on irregular shapes by calculations involving some of the curves used on round bars and flat plates, plotting "location lines" by which predictions may be made.

For shapes too irregular for calculation the method of "equivalent diameters" was suggested.

Chairman Zima, Mr. Abegg and Mr. Wilson led in the lively discussion which followed. It was brought out that data pertaining to tubes are sadly lacking.

Specifications for Cast Iron Praised As Step Forward

Reported by E. J. McKnight
Time-Keeper, Griffin Wheel Co.

Rocky Mountain Group was addressed by W. W. Kerlin of the Meehanite Corp. on "Casting Design and Engineering Properties of Cast Iron". Mr. Kerlin spoke in Pueblo on Jan. 16 and in Denver on the 17th.

"A. S. T. M. Standard Specification for Cast Iron A 48-36 is the greatest step forward ever made in the cast iron field," stated Mr. Kerlin.

"These specifications grade cast iron into seven groups, based on minimum tensile strength. This enables a prospective purchaser to more nearly determine the grade of cast iron desired for any particular purpose."

Mr. Kerlin said that while it is necessary to have the proper iron in the proper place, this does not necessarily mean that higher tensile irons are better than low tensile irons, for in some services low tensile iron out-performs high tensile.

Higher tensile iron usually has a finer grain size, greater resistance to fatigue than any other ferrous material in common use, and good corrosion resistance.

White, or chilled, iron can be either brittle or comparatively tough, depending upon the matrix. If the pearlitic matrix is continuous, then the iron is more likely to be tough than if the pearlite forms small islands surrounded by cementite.

The function of alloys in cast iron is to prevent the breaking up of the ferritic matrix.

Damping capacity of gray iron is being investigated at the present time in several different laboratories. It has long been known that gray iron has a much greater damping capacity than steel or high tensile iron and this has resulted in cast iron supplanting steel in various applications such as gears for printing presses.

In a coffee talk, Robert C. Black, III, of the Denver & Rio Grande Western Railroad, entertained with colored slides entitled "My Trip to the South Sea Islands".

Two Local Members Speak at Hartford

Hartford Chapter played host to two of its own members on Jan. 14.

R. W. Woodward of the research laboratory of Underwood Elliott Fisher Co. entertained some 40 members at dinner with a coffee talk on amateur radio. Going back to the early days of radio before the first World War, he told how the now famous Radio Relay League was first organized in Hartford.

His talk ended by handing out radiogram blanks for the members to write messages to friends or relatives, to be relayed by League members, in any part of the country.

After the dinner, the boys adjourned to the auditorium of the Gas Co. to hear another Hartford Chapter member, Joe Cerina of the heat treating department of Pratt & Whitney Aircraft, deliver one of his first and certainly one of his best talks on "Some Practical Notes on Protective Atmospheres".

Joe has been in charge of all heat treating activity at Pratt & Whitney Aircraft for some four years and is very well versed in the handling of production heat treating of aircraft engine parts.

Joe led his audience deftly through some of his earlier experiments with controlled atmospheres and gave them definite analyses of the gases used, only to point out chemically and physically why they could or could not be used satisfactorily.

He had with him some samples of unusual jobs he has done at the plant, a good assortment of slides and charts and a fund of knowledge backed up with the ability to put across a straightforward story of a most timely subject.

Stress Raisers Emphasized as Fatigue Danger

Reported by M. M. Holtgrieve
Hubbell & Company

St. Louis Chapter—At the meeting on Jan. 17, H. F. Moore, research professor of engineering materials at the University of Illinois, addressed the group on "Fatigue of Metals—What It Is and What to Do About It".

The talk, illustrated by lantern slides, was opened by a description of experiments performed on stud bolts, some subjected to steady load and others subjected to repeated loading.

The different effect of the screw threads on the strength under steady load and under repeated load was described as an illustration of the great importance of "stress raisers", such as screw threads, notched, sharp shoulders and holes in machine parts which are subjected to repeated load.

Airplane Accidents Due to Fatigue

This effect of a stress raiser was first noted in connection with railway car axles away back in the "fifties"—the days of Rankine and Woehler—but machine designers and structural engineers did not really appreciate its importance until recently; in fact, it is doubtful whether they fully realize it yet!

Today it is reported that, excluding crashes, fully 90% of the structural accidents to airplanes are due to fatigue failures, usually at points where there are stress raisers.

Professor Moore went on to say that "fatigue" strength of metal (strength under repeated stress) has no direct relationship with any kind of "elastic limit" or yield point, but that there seems to be some relationship with tensile strength. However, the ratio of fatigue strength to tensile strength is different for different metals.

Fatigue-Tensile Ratio Explained

For example, the ratio is somewhat smaller for very hard heat treated alloy steels than for soft, plain carbon steels; therefore, the advantage of such steels is not fully realized from the standpoint of fatigue strength, though the fatigue strength itself, of course, is higher. Moreover, heat treated alloy steels are more weakened by "stress raisers" than are low-strength plain carbon steels.

In concluding his talk, Professor Moore touched on the subject of failure due to corrosion and fatigue. The fatigue strength of steel may be reduced a great deal by the simultaneous action of corrosion and repeated stress, due to the constant cracking of the protective film which forms on the steel, and which under steady load acts as a protective coating against further corrosion.

Following the talk a lively question and answer session took place, many of the questions coming from E. M. Hanson, of the Axelson Mfg. Co.

The feature part of the program was preceded by a coffee talk by C. H. Frederickson, district sales manager for the American Air Lines, Inc.

Six Types of Service Failures Discussed By Eddy at Tri-City

Reported by James C. Erickson

Tri-City Chapter—W. Paul Eddy, Jr., metallurgical and service engineer of General Motors Truck and Coach, Pontiac, Mich., addressed members and guests at the Jan. 14th meeting held in Rock Island, Illinois. The topic of the address was "Service Failures".

The service failures discussed by Mr. Eddy were classified into six types: *(a)* Bending-fatigue, *(b)* torsion-fatigue, *(c)* compression-fatigue, *(d)* corrosion and corrosion-fatigue, *(e)* surface cracking failures, *(f)* scoring failures.

Bending-fatigue failures are occasionally accompanied by torsion. Poor design, rough finishing, burnt steel, and overloading are among the numerous causes. Shot-blasting may be of help in reducing this type of failure.

Longitudinal cracks are characteristic of torsion-fatigue failures with reversing stress. Often angles, such as those found at the splines of spline shafts, serve as stress-raisers from which the longitudinal cracks may be propagated.

Tool marks and other notches on an otherwise smooth surface may act as stress-raisers in the same manner. When the stress on a shaft is in one direction only, the fracture of torsion-fatigue failure occurs at a 45° angle with the axis of the shaft.

Oxidation of lubricating oils, as well as poorly carburized cases, is among the causes of compression-fatigue failure. Failure of this type is characterized by surface pitting as a result of cracks progressing parallel to and just beneath the surface.

A combination of stress and corrosion produces corrosion-fatigue failures. Parts such as piston pins, bearings, and leaf springs illustrate this type of failure.

When heat is generated at the surface of a metallic part at a faster rate than it can be dissipated, surface cracking may result. Grinding cracks are a common representative of surface cracking failures.

Scoring failures are often caused by misalignment of parts and the use of improper lubricants.

Chicago's Oldest Member Is Honored

William (Billy) Williams (Right) Receives a Life Membership Plaque From National President Harder in Recognition of His Active Service to the Chicago Chapter and the National Society Since Its Origin.

National and Chapter Officers Talk Over Activities and Plans

Reported by B. E. Sandell
Chief Chem. & Met., Stewart Die Casting Corp.

Chicago Chapter held its annual featured "President's Night" program on Jan. 9.

Prior to the evening meeting President Harder and Secretary Eisenman met with the Chicago Chapter's executive committee at a luncheon held in the Palmer House. Society activities during the past year and tentative plans for the coming year were discussed at this time.

As a prelude to the evening's meeting, President Harder presented a life membership plaque to Chicago's oldest member, William "Billy" Williams, in recognition of his faithful, loyal, and continuous service to the Society.

Bill Williams has been one of the Chicago Chapter's most active members since its very origin, and he has done much to promote and support all A.S.M. activities. Billy's words of acknowledgment following the presentation were indeed an exemplification of true A.S.M. spirit, and will long be remembered by all who were privileged to hear them.

Mr. Eisenman acted as technical chairman for the meeting proper and his usual wit was much in evidence.

Dr. Harder spoke on "Progress in Physical Metallurgy", and covered both the ferrous and non-ferrous fields. He presented an excellent treatise on work that has been done, and work that remains to be done.

The meeting adjourned with a rising vote of thanks to President Harder and Secretary Eisenman.

Joint Meeting Held With Welding Society Reviews Recent Shipbuilding Program

Reported by Forrest R. Nagley
Associate Engineer, Navy Dept.

Washington Chapter heard the solution to several metallurgical shipbuilding problems in its annual joint meeting with the local chapter of the American Welding Society.

Paul Ffield, materials engineer for the Shipbuilding Division of the Bethlehem Steel Co. at Quincy, Mass., presented illustrations of certain service requirements of marine structures, and the performance demands on metals and weldments.

For structural reasons, the naval architect may wish to form structural steel over a tight radius. For metallurgical reasons, the metallurgist endeavors to utilize as liberal a radius as possible particularly when cold forming structural steel.

Shipbuilding then may involve forming operations which are a compromise, with the shipbuilder forming the plate over as tight a radius as he can without outward signs of distress. However, it was shown that a loss of impact strength results from short radius bending of thick plates.

Other drastic forming operations discussed included the joggling of hull plates and the drum-head welding of bulkheads where a deliberate attempt is made to restrain the metal from free shrinkage during welding.

In discussing welding, slides were presented which showed severe anodic corrosion of hull plates resulting from inadequate electrical ground leads when the ship was welded in the fitting out basin.

Mr. Ffield closed by saying that while many of the shipbuilder's fabricating operations produce undesirable metallurgical conditions, these operations are nonetheless very practical as far as the shipbuilder is concerned. Some of the fabricating operations were analyzed to illustrate the benefits derived from proper application of metallurgical principles.

It was shown that cooperation between the shipbuilder and the metallurgist could easily lead to the development of a satisfactory metallurgical procedure which was not impracticable from the shipbuilder's viewpoint.

Designers, Heat Treaters Interested in Talk on Dies

Reported by Walter M. Saunders, Jr.
Consulting Chemist and Metallurgist

Rhode Island Chapter—The sins of commission and omission of designers and heat treaters might have appropriately titled the talk given at the Dec. 4th meeting, held jointly with the Designing Section of the Providence Engineering Society.

A gathering of about 175 heard Hugh E. Replogle, then with the Tool Steel Division, Crucible Steel Co. of America, speak on "Selection, Heat Treatment, and Design of Metal Working Dies".

"Eclipse Experiences" was the subject of Prof. Charles H. Smiley, Department of Astronomy of Brown University, at the dinner before the meeting. After spending several months in preparation, and a long journey to South America last summer, clouds completely covered the sun on the day of the eclipse.

Heat treaters and designers are not the only people that things happen to!

Slides and Movies Illustrate Machining

Reported by Charles A. Nagler
Instructor, University of Minnesota

North West Chapter—The December meeting was held at the new Coffman Memorial Union on the campus of the University of Minnesota. Dr. Mario Martellotti of the Cincinnati Milling Machine Company, Cincinnati, Ohio, spoke on "Machinability".

The talk covered the work done at the Cincinnati Milling Machine Co. and was presented in pictorial form by means of slides and motion pictures.

The fact was brought out that when a flat faced punch is forced into a block of ductile material, the material ahead of the punch is compressed and seeks to escape by plastic flow. This was followed by scenes showing the stress distribution occurring in photoplastic material when indented by a flat, a narrow-faced and a knife-edge punch.

The talk also covered chip formation under the microscope. This was discussed under three headings:

(a) Discontinuous chip.

(b) Continuous chip with continuous escaping compressed layer adjacent to the tool face.

(c) Continuous chip with built-up edge adjacent to the tool face.

A number of photomicrographs illustrated the type *c* chip and the type of machined surface obtained.

The effect of cutting fluid on chip formation was discussed, and the quality of surface as affected by the work temperature was shown.

Members of the local chapter of the American Society of Tool Engineers were invited to participate in this meeting and many of them attended.

Al Bronzes May Have to Replace Alloys Using Tin

Reported by R. H. Stewart
Chief Chemist, Prest-O-Lite Co., Inc.

Indianapolis Chapter — The importance of aluminum bronzes at the present time was stressed by S. C. Lawson of Ampco Metal, Inc., in an instructive lecture on Dec. 16. He explained that world conditions might seriously affect the supply of tin which is used in the tin-bearing bronze alloys. The properties of the aluminum bronzes of various compositions were compared with fundamental engineering data on copper-zinc and copper-tin alloys and the former were correlated with existing industrial and Federal specifications.

Mr. Lawson discussed the wide scope of applications of aluminum bronzes, together with specific uses of centrifugally cast, sand cast and heat treated parts. Particular uses in various types of industry, including machine tools, airplanes and as safety tools were pointed out.

Following the lecture, a sound-color film showed the production of aluminum bronzes including pattern making, molding, core making, melting, heat treating, machining, centrifugal casting and control of product at the Ampco Metal Plant.

Helpful Literature — Mail Coupon Below

Globar Elements
Globar Pin Type Non-Metallic Electric Heating Elements and Terminal Rods and Globar "AT" Type Non-Metallic Electric Heating Elements are explained and illustrated in two booklets issued by the Globar Division of the Carborundum Company. Bulletin Lb-25.

Motor Blower
Blowers used for oil and gas burning are featured in an interesting booklet by Ingersoll-Rand. Bulletin Kd-222.

Insulation
A 32-page catalog containing specific information on all of the sheet, block and pipe insulations developed by the Johns-Manville Company, is now available through that company. Bulletin Fb-100.

Lectromelt Furnaces
The story behind lectromelt furnaces is well told in this 48-page booklet issued by the Pittsburgh Lectromelt Furnace Corporation. Tells of development of this type furnace and describes recent improvements. Bulletin Db-18.

Electric Furnaces
Economy . . . ruggedness . . . speed . . . and versatility distinguish the line of electric furnaces described in a new bulletin by The Detroit Electric Furnace Division, Kuhlman Electric Co. Bulletin Hd-271.

Salt Bath Furnace
New 20-page Catalog describing the Ajax-Hultgren Electric Salt Bath Furnace. Gives detailed data on all heat treating applications such as carburizing, cyanide hardening, hardening carbon and high speed steel tools without scale or decarb, heat treating aluminum alloys, tempering steel products, heating for forging, brazing, etc. Bulletin Nd-43.

Furnace Experience
Facts developed through 32 years of engineering and building practically every type of industrial fuel equipment can be obtained through Flinn & Dreffein Co. Bulletin Bc-82.

Refractory Cement
An economical silicon carbide cement for general service in furnace linings is described in a colorful folder released by the Norton Co. Bulletin Be-88.

Convected Air Furnaces
A brand-new, 12-page illustrated booklet full of ideas for solving your furnace problems is now available through the Despatch Oven Co. Covers many unusual features of Despatch recirculating convected air furnaces. Bulletin Nd-123.

Furnace Catalog
A 120-page catalog covering the complete line of furnaces and burners manufactured by The American Gas Furnace Co. is available to companies who request this book through THE REVIEW on their company letterhead. Bulletin Be-11.

Turbo-Compressors
Spencer Turbine Co. has turbo-compressors in all sizes and types for oil and gas-fired furnaces, ovens and foundry cupolas. Special types for special purposes such as gas-tight and corrosion resisting applications are also described in Bulletin Da-70.

Cadmium Plating
Concise, practical information for the operating plater is included in an up-to-date manual on cadmium plating released by E. I. DuPont de Nemours & Co., Inc. Bulletin Hd-29.

Rust Prevention
How to protect against rust on anything from a needle to a battleship is explained in an interesting folder printed by E. F. Houghton & Co. Bulletin Be-38.

New Cleaning Methods
Illustrated new 32-page booklet issued by Oakite Products, Inc., describes formulas, methods for safely cleaning aluminum, magnesium, zinc die castings and other metals and alloys before electroplating, cleaning polished steel, brass, copper. Also includes data on tumbling, burnishing, pickling. Bulletin Nd-296.

Thermocouple Pyrometers
A 28-page catalog issued by Leeds & Northrup Co. lists everything needed to check thermocouple pyrometers. Bulletin Ae-46.

Rocker Barrels
The operation of cleaning miscellaneous items of gray iron, steel, semi-steel malleables, forgings, plate, bars, bronze and other castings by the Airless Rotoblast method is described fully in a handsome booklet by the Pangborn Corp. Bulletin Ae-68.

Mounted Wheel Chart
A convenient ready reference wall chart showing mounted grinding wheels should be of great advantage in the cleaning room, pattern shop, tool and die room, and many other places. It gives at a glance, by means of detailed drawings, actual size, the exact radius of each wheel and its exact shape. Chicago Wheel & Mfg. Co. Bulletin Bd-230.

Pocket Relationship Table
A very handy celluloid table which fits snugly in your pocket and shows the relationship between Rockwell, Brinell, and Vickers hardnesses has been prepared by Wilson Mechanical Instrument Co. Bulletin Be-22.

Fatigue Testing
Improved to meet demands for rapid fatigue tests, the R. R. Moore high speed Fatigue Testing Machine developed by the Baldwin-Southwark Div., Baldwin Locomotive Wks., now operates at speeds of 10,000 r.p.m. New literature contains details. Bulletin Be-67.

Thermocouple Head
Thermocouple heads and parts are covered in literature by Claud S. Gordon Co. Bulletin Be-53.

Metallographic Equipment
The 100-page "Metal Analyst" issued by Adolph I. Buehler features new Metallographic Sample Preparation Equipment; a comparative listing of Metal Microscopes, Measuring Microscopes, and Spectrographs; an index of over 1,000 new technical books and papers; and a treatise on the Application of Reflected Light. Bulletin Ed-135.

Mayari R
Mayari R, high-strength corrosion-resisting steel produced by the Bethlehem Steel Co., is featured in a new 32-page booklet illustrated with applications and facts concerning this versatile steel. Bulletin Be-76.

Machinery Steel
Describing the remarkable qualities of Stress-proof No. 2, a non-warping shafting and machinery steel combining high strength, free machinability and unique wearability, an interesting bulletin has been prepared by Joseph T. Ryerson & Son, Inc. Bulletin Id-106.

Heat Resisting Castings
A 4-page folder on Pyrasteel heat resisting castings, that shows applications of special alloy steels and their analyses, also information on welding alloy steels, is available through Chicago Steel Foundry Co. Bulletin Cb-184.

Die Steels
For applications where toughness and the ability to withstand wear is essential, the G.S.N. Die Steels described in Latrobe Electric Steel Company's new booklet fill the bill. Bulletin Ld-208.

18-8 Types
Properties, fabrication, corrosion-resistance and applications of Republic Steel Company's ENDURO 18-8 are covered in a new 24-page booklet. Bulletin Be-8.

Columbium
"Advantages of Columbium in Wrought 4 to 6 Per Cent Chromium Steel" is the title of a booklet which gives detailed test data to prove its advantages. Bulletin Cc-16.

Tool Steel Selector
A new chart of Tool Steel Recommendations which helps you select the best steel for each tool is available through the Jessop Steel Co. Bulletin Fd-173.

Meehanite Castings
An interesting, well-illustrated 49-page booklet, "Meehanite in Industry" covering applications of Meehanite castings in a variety of industries, is now available through the Meehanite Research Institute of America, Inc. Bulletin Ce-165.

Hard Facing Alloys
For maximum resistance to wear and corrosion, the Wall-Colmonoy Corp. offers a fact-packed folder which is extremely helpful to anyone having this problem. Bulletin Kd-85.

Graphitic Steel
A new 16-page booklet showing 24 specific Graphitic Steel Applications for increasing tool speed and reducing replacements is just off the press—available through The Timken Roller Bearing Co. Bulletin Nd-71.

Moly in Steel
Metallurgists, engineers and production executives who are really interested in the metallurgy of steels and their application will want the excellent book on molybdenum steels published by Climax Molybdenum Company. Bound in loose-leaf manner, this reference book is chock-full of tables which form a volume almost an inch thick. Bulletin Hb-4.

Gas Carburizing
"Three methods of gas carburizing," a reprint of an article by W. A. Darrah, Pres., Continental Industrial Engineers, Inc., is available for those interested in this subject. Bulletin Kc-154.

Heat Treat Chart
Heat treaters everywhere should find a heat treating wall chart complete with S.A.E. specifications a very valuable addition to their shops. Published by Chicago Flexible Shaft Co., manufacturers of Stewart industrial furnaces. Bulletin Ka-49.

Welding Aluminum
A very attractive little 48-page booklet which tells all about the welding of aluminum and its alloys has been issued by the Aluminum Company of America. Describes the different methods of welding and shows by means of pictures and diagrams the best methods of welding. Bulletin Hb-54.

Metal Welding
Of particular interest to the aircraft industry and all fabricators of light-gauge metal will be the booklet "Sheet Metal Welding Fundamentals" released by the Linde Air Products Co. Bulletin Ed-63.

Welding Stainless
How to weld stainless steels is described in a colorful 12-page folder released by the Page Steel and Wire Division of American Chain & Cable Co., Inc. Bulletin Cc-86.

Welding Alloys
New low temperature welding alloys which bind by eutectic low temperature reaction to give stronger joints are described in literature available through Eutectic Welding Alloys, Inc. Bulletin Be-301.

Arc Welding Electrodes
A new 24-page, pocket-size pamphlet on its Murex line of arc welding electrodes describing the welding characteristics and other properties is now available through Metal & Thermit Corp. Bulletin Ae-64.

Heat Resisting Alloys
Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

High Temperature
High temperature uses of Monel, Nickel and Inconel are analyzed and pictured in a recently printed bulletin released by International Nickel Co. Bulletin Kd-45.

Dowmetal Data Book
A new edition, containing especially significant accomplishments in the sections of "Available Forms" and "Shop Practice", has been published by Dow Chemical Co., Dowmetal Div. Bulletin Ec-215.

Nonferrous Data
Valuable reference material is contained in an 18-page booklet released by Revere Copper & Brass, Inc., containing practical and complete tables of Weights and Data on Copper, Brass and Bronze products. Bulletin Be-239.

Copper Bulletin
A new clearing house for news of developments in brass, bronze, and copper, the "Copper Alloy Bulletin", issued by the Bridgeport Brass Co., made its appearance with the March issue. It is edited for the technical and engineering audience. Bulletin Da-163.

Cecostamp
A high production, impact-type stamping machine developed for forming stainless steel, thin hot work that cools quickly, embossing, and work hard to set to final shape is described in an instructive 16-page booklet by the Chambersburg Engineering Co. Bulletin Gc-132.

Potentiometer Controllers
Designed for applications requiring the utmost accuracy and sensitivity in temperature control, a complete line of potentiometer controllers is described in literature made available by Wheelco Instruments Co. Bulletin Ae-110.

Foundry Sand
A pamphlet recently issued on TAM Foundry Zircon Sand and TAM Zircon Flour contains detailed information on these products of the Titanium Alloy Mfg. Co. Bulletin Hc-90.

Forgings
Forgings for All Industries are described in a new booklet released by the Ajax Steel and Forge Company. Very helpful to all users of forgings. Bulletin Kb-200.

Magnefer
The reasons why "Magnefer" is more than "just another" clinkered dolomite are presented in an attractive folder by Basic Dolomite, Inc. Bulletin Ae-192.

Shear Knife
A handbook describing the development of the solid steel shear knife by Sam Heppenstall, founder of the Heppenstall Company. Compact, bound in imitation leather, this booklet contains valuable data in the form of hardness conversion table and shear knife performance charts. Bulletin Db-122.

Heroult Furnace
Revised and expanded to include modern major innovations in the construction and operation of the Heroult electric furnace, the latest edition of the American Bridge Co.'s Heroult Electric Furnace Bulletin is available. Bulletin Bb-124.

Valcase
Chapman Valve Co. has a fused salt bath mixture known as Valcase which forms a perfectly balanced and economical carburizing bath. A folder gives instructions for handling and use and typical results obtained. Bulletin Na-80.

Contour Machining
A new Handbook on Contour Machining containing 158 pages of valuable metal working helps is being made available by Continental Machines, Inc. Bulletin Nd-170.

Band Saws
Actual performance records of DoALL Band Saws are contained in a booklet made available by the DoAll Co., Inc. Bulletin Ae-297.

Carbide Tools
"Firthite General Purpose Tools" is the title of a new bulletin and price list available from Firth-Sterling Steel Co. Bulletin Ae-177.

Cutting Oil
An informative booklet containing 48-pages of scientific applications for the largest selling sulphurized cutting oil is offered by D. A. Stuart Oil Co., Ltd. Bulletin Kd-118.

Cutting Oils
An interesting new booklet, "Metal Cutting Lubrication—In Theory and Practice", has just been made available by Cities Service Oil Co. Bulletin Ec-113.

Recorder-Controllers
Foxboro's new booklet describes the permanent precision, low maintenance and reductions in spare-parts inventories for Potentiometer Recorders and Recorder-Controllers. Bulletin Kd-21.

N-A-X
New twenty-page, fully illustrated booklet on N-A-X high tensile low alloy steel has just been published by Great Lakes Steel Corporation. This steel has been thoroughly proved in application where ordinary high tensile steels have failed. Bulletin Kd-229.

Free Machining Steels
Speed Case and Speed Treat, two steels with increased machining properties, are described in literature available through Monarch Steel Co. Bulletin Cd-255.

Steel Data Sheets
Wheelock, Lovejoy & Co. gives analyses, physical properties, heat treating instructions, and applications of Hy-Ten, Economo, and S.A.E. alloy steels in concise and easily usable form. Bulletin Ox-74.

Rustless Handbook
Offered as an answer to the question, "Which stainless steel?", a 60-page handbook by Rustless Iron and Steel Corp. gives complete information on properties, processing, and engineering applications of a wide variety of rustless and stainless steels. Excellently arranged and printed. Bulletin Bd-169.

Welded Stainless Tubes
A really striking 16-page booklet containing 45 illustrations on Welded Stainless Tubing is offered by the Carpenter Steel Co. Bulletin Kd-12.

Industrial Furnaces
Furnaces of all types are fully described in technical bulletins made available by the Eclipse Fuel Engineering Co. Bulletin Hc-226.

Metal Heating
Improvements in furnace economies, operating conditions and appearance, furnaces that will more satisfactorily meet old requirements or handle new processes, service that will help solve the most stubborn problems are offered and described by Mahr Mfg. Co. in Bulletin Ea-5.

Oil Burners
North American Mfg. Co. offers a bulletin describing improved low pressure oil burners, one type especially designed for automatic control and ideally suited for use with proportioning control valves. Bulletin Na-138.

Electric Furnaces
A new catalog on electric furnaces and pyrometers has been released by the Hoskins Manufacturing Company. For anyone who does any kind of heat-treating, brazing, or uses heat-resisting castings. Bulletin Hc-24.

Super Refractories
A very handsome spiral-bound 76-page catalog covering their extensive line of refractories for heavy duty service is offered by the Corborundum Co. Bulletin Ld-57.

Aircraft Heat Treating
A special bulletin "Heat Treating Furnaces for the Aircraft Industry" has just been prepared by the Lindberg Engineering Co. Bulletin Nd-66.

Electric Furnaces
A four-page bulletin on ½ lb. to 4 lb. high frequency melting furnaces and 3 kw. converter is now available through the Ajax Electrothermic Corp. Bulletin Dd-41.

Tocco Process
The marvel of all heat treaters—the Tocco Process of Induction Hardening—is fully described in a colorful folder by the Ohio Crankshaft Co. Bulletin Lc-145.

X-Ray Inspected Castings
All types of heat and corrosion resistant castings made with extensive use of "X-Ray Inspection" and modern foundry methods are shown and described in a 16-page two-color booklet made available by the Electro-Alloys Co. Bulletin Ld-32.

The Review
7301 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature. (Circle the numbers that interest you. It is important to write in your company or business connection when you return this coupon.)

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Lb-25	Nd-123	Ae-68	Cb-184	Nd-71	Kd-45	Bb-124	Bd-169
Kd-222	Be-11	Bd-230	Ld-208	Hb-4	Ec-215	Na-80	Kd-12
Fb-100	Da-70	Be-22	Be-8	Kc-154	Be-239	Nd-170	Hc-226
Db-18	Hd-29	Be-67	Cc-16	Ka-49	Da-163	Ae-297	Ea-5
Hd-271	Be-38	Be-53	Fd-173	Hb-54	Ge-132	Ae-177	Na-138
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				Ae-64	Ae-192	Kd-229	Dd-41
				D-17	Db-122	Cd-255	Le-145
						Ox-74	Ld-32

Shortcomings Of Mechanical Tests Exposed

Reported by Joseph Missimer
Salesman, L. Norris Hall, Inc.

Philadelphia Chapter met at the Engineers Club on Jan. 3, and was addressed by R. L. Templin of the Aluminum Co. of America. His subject was "Mechanical Property Tests of Metals".

He explained that his remarks would be directed at what he felt were the shortcomings of the various tests.

Slides and graphs on tensile testing showed how important it is to use standard test specimens. Slight variations in the size and shape of standard specimens can result in a wide range of tensile readings for the same metal.

The speaker also remarked that elongation values are not significant unless a specific gage length be used. In conjunction with tensile testing the subject of yield strength was covered, disclosing the fact that we have a great many definitions of the yield point.

New Compression Tests Discussed

Speaking of two new methods for making compression tests of thin sheet metals, he showed that this type of testing is too slow and costly, and hence not adaptable to routine inspection testing.

Alternate tensile and compression over-stress on the same specimen will bring about certain changes in the stress-strain curve. If you know the tensile yield values of certain products you can determine fairly closely the compressive yield values.

Taking up the subject of hardness testing, Mr. Templin produced a collection of slides which showed the many irregularly shaped impressions which he had observed. Some of these were caused by differences in directional properties.

The linear relationship between hardness and tensile tests was discussed, but this relationship is not too dependable for determining tensile strengths.

Great Strides Being Made

By way of summary, Mr. Templin opined that in many instances it is wrong to select design stress values on the basis of guaranteed minimum tensile values and quite inconsistent with the selection of design values for shear, or bearing, or compression, etc. The use of the tensile test for checking the physical properties of incoming material, particularly from new sources of supply, is a legitimate use for these tests, and is looked upon as extremely good practice.

In conclusion, our speaker explained that his remarks were not meant to be pessimistic in any sense of the word. He felt that great strides had been made in this field of endeavor.

He left us with the thought that, to be of real value, we must, in our mechanical testing of metals, stick to standards set up; that we must take care in the preparation of test specimens; that we must regularly check the accuracy of the testing machines; and that we use the various tests for the purposes for which they were intended.

Ford Official to Talk at Peoria

Peoria Chapter has announced that W. J. Cameron, radio speaker on the Ford Motor Co.'s Sunday evening hour, will speak at a dinner meeting on March 10.

Other groups have also been invited to take advantage of this opportunity to hear Mr. Cameron, and a large attendance is expected.

Here and There With A.S.M. Members

MORRIS ASIMOW, whose name is often linked with that of Dr. Grossmann in studies on hardenability at Carnegie-Illinois Steel Corp.'s Gary Works, is now back in Los Angeles in business for himself, operating a steel stamping and forming plant, known as the Central Metal Products Co.

Dr. Asimow graduated from University of California in 1927, received his M.S. in 1932, and Ph.D. in 1934. In the meantime he also worked for the Southern California Edison Co. as junior engineer and subsequently as tool and die maker and designer.

From 1930 to 1936 he was instructor of metallurgical engineering at the University, and then came to Chicago as metallurgical representative for Carnegie-Illinois Steel Corp. Since 1937 he has been research metallurgist.

* * *

UNIVERSAL-CYCLOPS Steel Corp. has announced that W. J. LONG, manager of sales at the Worcester, Mass., office for ten years, and a past chairman of the Worcester Chapter A.S.M., has been transferred to the executive offices as assistant general sales manager.

W. J. Long

Mr. Long will assist in the direction of sales of tool steels and will make his headquarters in Bridgeville, Pa.

W. P. KNECHT, also an active member of the Worcester Chapter, has taken Mr. Long's place as manager of the Worcester branch.

* * *

HUGH E. REPLOGLE has joined the organization of the Universal-Cyclops Steel Corp. in a general tool steel sales capacity. His headquarters will be at the Cyclops Division, Titusville, Pa. Mr. Replogle was formerly associated with the Crucible Steel Co. of America.

* * *

R. J. COWAN, formerly metallurgical engineer for Surface Combustion Corp., Toledo, is now engaged in the work of the Christian Ministry, having been assigned by the Free Methodist denomination to the pastorate of a small congregation in Lima, Ohio.

Mr. Cowan writes that he has not lost interest in things metallurgical, however, and Surface Combustion has retained his services for a time on a consulting basis. He expects to maintain his memberships and contacts, and probably contribute from time to time to the literature.

* * *

IN last month's "Compliments" column A. R. TROIANO was wrongly credited to Harvard University. He is professor of metallurgy at University of Notre Dame. Excuse it please!

Foundry Acquires Buildings

The Cooper Alloy Foundry Co., manufacturers of alloy steel castings, valves and fittings, has acquired an additional 20,000 sq. ft. of buildings in Hillside, N. J.

The buildings and plant were purchased from the Breen Iron Works to handle the rapidly expanding business and to expedite service to the process industries and others affected by the defense program.

The new unit will in no way affect the main plant at Elizabeth, N. J., which will retain the executive offices and continue to operate as a complete division.

DIED

WILLIAM NETTLETON, 72, president and founder of the Nettleton Steel Co., Cleveland, died of pneumonia Dec. 22.

Wm. Nettleton

He had been active in the company up until two weeks before his death.

One of the first members of the Cleveland Chapter, he had been an active A.S.M. supporter for many years.

Mr. Nettleton spent 40 years in the heat treating business with Crosby Stamping Co., Peerless Motor Co., and Parish and Bingham, and founded his own company in 1921.

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ALEXANDER A. HARVEY, vice-president and sales manager of the Sentry Co., Foxboro, Mass., died suddenly of a heart attack on Jan. 14.

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W. T. MORGAN, a past chairman of the Rochester Chapter, died of a heart attack on Feb. 1.

Born in Wales and educated at Swansea Technical College and Sheffield University, under famed Prof. C. H. Desch, Mr. Morgan served five years in the first world war, was associated with R. D. Thomas and Co. and the Department of Scientific Research of the British Admiralty.

W. T. Morgan

He came to the United States in 1927, and his first job was with Babcock and Wilcox Co. Since 1929 he has been chief metallurgist for the Taylor Instrument Co's.

Axiom and Corollary Are Applied to Grain Size of Tool Steel

Reported by Robert D. Stout
Dept. of Metallurgy, Lehigh University

Lehigh Valley Chapter—Speaking on "Grain Growth in High Speed Steel" on Jan. 3, Norman I. Stotz, metallurgical engineer for Universal-Cyclops Steel Corp., Titusville, Pa., presented an axiom and a corollary which he believes to be generally true, namely:

1. All other things being equal, the tool having the largest grain size which the service stresses will permit it to carry without breaking will give the best cutting results.

2. All other things being equal, if two tools have equal grain size produced by different heat treating methods, the one that has been treated in the higher temperature with the shorter soaking time will show the better cutting efficiency.

Mr. Stotz proceeded further to group high speed steels into several general classes, in which the molybdenum type was made directly comparable to the tungsten by multiplying the Mo content by two, in order to make its effect equivalent to that of tungsten. Molybdenum steels must generally be higher in carbon content to obtain most satisfactory results.

The intercept method of measuring grain size was described briefly. The development of an etchant capable of bringing out austenitic grain boundaries in drawn high speed was important to permit examination of tools which had been in service.

Mr. Stotz's talk was much appreciated by his audience who took advantage of the discussion period to ply him with questions.

Transactions Index Now Ready

An index to Vol. XXVIII of TRANSACTIONS, covering the four quarterly issues in 1940, has been prepared and is available to members of the Society at no charge, on request to the American Society for Metals, 7301 Euclid Ave., Cleveland.

Coloron Process for Stainless Described

(Continued from page 1)

attributed to their relative softness and the fact that the photo image is maintained solely by adsorption to the base metal whereas the image on the anodically prepared stainless steel plates is *absorbed* within the color film to its full depth, and to lose the image, the color film must be destroyed.

Primary color processing of stainless steels relies upon a step of direct surface and sub-surface oxidation by immersing the specimen in a dual acid electrolyte which is maintained at about 185° F. Maximum and uniform color oxidation may be effected in about 22 min.

The electrolyte consists of a 1:1 solution of concentrated sulphuric acid and water with an inhibitor added. The solution also contains an "activator" which reduces the coloring period from days to minutes.

A few of the products which have been color processed are watch cases, golf club heads and shafts, camera parts, clock and capillary thermometer dials, optical goods, range finders, airplane control instruments, etc.

Under primary steps and in a typical coloron electrolyte a definite range of colors can be produced on highly polished 18-8 steel, which appear in succession with increasing depth of oxide film.

A typical "coloron" set-up usually consists of a tellurium-lead-lined tank with heat supplied to the solution by a gas-fired immersion type heating unit. The lead lining serves as the cathode and the work as the anode.

Texas Chapter Holds First Golf Tournament on Jan. 11

Reported by L. D. Richards
Heat Treat Dept., Hughes Tool Co.

Texas Chapter—After a long series of postponements due to weather which has tried hard to imitate a tropical rainy season, the first annual golf tournament was finally played off.

The competition was held at Golfcrest Country Club on Jan. 11 with a field of 64 players participating. The trophy for low gross score went to H. E. "Rip" Collins. High gross was confessed to by W. R. White. Eben G. Laws had low net score.

With divots replanted, lost balls forgotten and alibis in the making, all hands repaired to the 19th hole for a banquet and appropriate refreshments.

Chairman W. W. Hampton gave Collins a stiff fight for the trophy which must be won three times for permanent possession. A few strokes short (or long), Hampton vows vengeance and a different story for next year.

Expect 50,000 at Western Metal Congress and Expo

(Continued from page 1)

Congress and Exposition. They are:

American Ceramic Society, American Chemical Society, American Foundrymen's Association, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Petroleum Institute, American Society of Civil Engineers, American Society for Testing Materials, American Welding Society.

California Gas and Oil Association, Institute of Aeronautical Sciences, Liquefied Petroleum Gas Association, Metal Trades and Manufacturers' Association, Mining Association of the Southwest, National Purchasing Agents' Association, Pacific Coast Electrical Association, Pacific Coast Gas Association, Society of Automotive Engineers, Wire Association.

Position Open

ASSISTANT METALLURGIST: Both ferrous and non-ferrous work in research department of company making optical goods, as assistant to senior metallurgist. New England location. **Address Box 2-S, A.S.M., 7301 Euclid Ave., Cleveland.**

Movie on Can Manufacture Is Appetizer for Crane's Talk on Plastic Working

Reported by Waldemar Naujoks
Chief Engineer, Steel Improvement & Forge Co.

Cleveland Chapter—At the regular monthly meeting on Jan. 6, a talk was presented on "Plastic Deformation of Metals" by E. V. Crane, engineer & consultant, E. W. Bliss Co.

Mr. Crane is an authority on the use of presses for plastic working of metals, and author of a book on this subject.

As an appetizer Mr. Crane presented a movie on the making of cans by the use of automatic presses and conveyor equipment. It showed the many operations and variety of equipment necessary for the production of tin cans of all shapes and sizes, and Mr. Crane injected timely remarks to clarify various points.

The regular talk on "Plastic Deformation of Metals" was an interesting presentation of the theory of plastic deformation and the practical application of methods and technique based on the theory.

Slides were used to illustrate the method of determining the true elastic limit as cold deformation takes place between the elastic limit and the ultimate strength of the metal.

This was followed by a discussion of the various types of press operations including shearing and punching, stretching and deep drawing, sizing and coining, and forming. A large number of interesting slides illustrated the different types and sizes of presses, both mechanical and hydraulic.

Mr. Crane was presented to the 400 members present by Waldemar Naujoks, chief engineer of The Steel Improvement & Forge Co., who acted as technical chairman for the evening.

New Type of Course Teaches by Shop Projects

Sacramento Junior College, Sacramento, Calif., has inaugurated a new type of course which should be of interest to engineering students.

In an attempt to teach science, mathematics, and drawing by actual application, each student is assigned a project similar to the jobs assigned in industry. He carries this project from its inception through its design, making all necessary drawings, followed by a stock list. He then makes in the shop every part of his project.

Facilities will be provided for forging, foundry, machine shop, sheet metal shop, metal spinning, heat treating and welding.

The projects at first will necessarily be simple, but by the end of the second year, a student should be able to design and build rather complicated mechanisms. Although a certain amount of reading and study will be required, very little lecturing will be done.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Mar. 7	.....	Frank Palmer	Joint Meeting with American Society of Tool Engineers
Buffalo	Mar. 13	Hotel Buffalo	.....	Movie Night
Calumet	Mar. 18	Woodmar Country Club, Hammond, Ind.	J. J. Kanter	Research in the Metallurgy of Valve Manufacture
Canton-Mass.	Mar. 20	Elks Club, Canton	L. W. Davis	Use and Production of Aluminum for Aircraft
Chicago	Mar. 13	Towers Club	Stanley P. Watkins	Manufacture and Uses of Stainless Steels
Cleveland	Mar. 3	Cleveland Club	V. N. Krivobok	Technical and Industrial Evaluation of Stainless Alloys
Columbus	Mar. 11	Fort Hayes Hotel	L. H. Milligan	Properties of Abrasives
Dayton	Mar. 13	Engineers Club	R. E. Desvernine	Joint Meeting with Purchasing Agents Association
Detroit	Mar. 10	Webster Hall	O. J. Horger	Fatigue of Metals With Related Photo-Elastic Studies
Hartford	Mar. 11	Hartford Gas Co.	M. A. Grossmann	Hardenability of Steel
Indianapolis	Mar. 17	Washington Hotel	Arthur E. Focke	Grain Size
Lehigh Valley	Mar. 7	Hotel Traylor, Allentown, Pa.	Samuel L. Hoyt	Impact and Fatigue
Milwaukee	Mar. 18	Milwaukee Athletic Club	F. L. LaQue	Corrosion of Nickel and Other Alloys
Montreal	Mar. 3	Windsor Hotel	C. J. MacKenzie	Operations of National Research Laboratories
New Haven	Mar. 20	Hotel Barnum, Bridgeport, Conn.	J. R. Townsend	Fatigue and Its Relation to Mechanical and Metallurgical Properties of Metals
New York	Mar. 10	Bldg. Trade Employers Assoc. Clubroom	Philip McKenna	Sintered Carbides
North West	Mar. 13	Coffman Memorial Union, Univ. of Minn.	G. J. Comstock	Powder Metallurgy
Notre Dame	Mar. 12	Engineering Audit., Univ. of Notre Dame	M. F. Judkins	Powder Metallurgy
Ontario	Mar. 7	Hamilton	E. V. Crane	Plastic Working of Metals and Power Press Operations
Peoria	Mar. 10	.....	W. J. Cameron	A Subject of General Interest
Philadelphia	Mar. 28	Engineers Club	.....	Information Please
Pittsburgh	Mar. 13	Roosevelt Hotel	.....	Young Fellows' Night
Rhode Island	Mar. 5	Providence Engineering Society	W. R. Frazer	Metallurgical Control in the Manufacture of High Speed Tools
Rochester	Mar. 10	Lower Strong Auditorium, Univ. of Rochester	Henry M. Heyn	Modern Furnaces and Furnace Atmospheres
Rockford	Mar. 26	Elks Club	F. R. Bonte	Graphitic Steels
Rocky Mtn.	Mar. 21	Oxford Hotel, Denver	R. S. Dean	Electrolytic Manganese and Its Alloys
Saginaw Valley Group	Mar. 18	Durant Hotel, Flint, Mich.	L. S. Bergen	Armament Steels
Schenectady	Mar. 25	.....	T. Holland Nelson	Romance of Stainless Steels
Southern Tier	Mar. 24	Jenkins Inn, Waverly, N. Y.	R. W. Mitchell	Ball Burnishing
Springfield	Mar. 17	Western Mass. Electric Co., Greenfield, Mass.	W. E. Benninghoff	Differential Hardening by Induction
Texas	Mar. 20	River Oaks Country Club, Houston	E. C. Bain	.....
Toledo Group	Mar. 24	Hillcrest Hotel	Oscar E. Harder	Alloys, Their Make-up and Importance to Industry
Tri-City	Mar. 11	Hotel Ft. Armstrong, Rock Island, Ill.	E. F. Davis	Gears
Washington	Mar. 10	Dodge Garden House	A. A. Bates	Plastics
Worcester	Mar. 10	Putnam & Thurston's	Norman Stotz	Tool Steels
York	Mar. 12	Gettysburg, Pa.	A. Floyd Whalen	Romance in Gas

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